

**$\psi(4390)$** 

$$I^G(J^{PC}) = 0^-(1^{--})$$

*I* needs confirmation.

OMITTED FROM SUMMARY TABLE  
was  $X(4390)$

This state shows properties different from a conventional  $q\bar{q}$  state.  
A candidate for an exotic structure. See the review on non- $q\bar{q}$  states.

NODE=M236

NODE=M236

 **$\psi(4390)$  MASS**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>4390 ± 6 OUR AVERAGE</b> [4392 ± 7 MeV OUR 2020 AVERAGE]			
4382.0 ± 13.3 ± 1.7	<sup>1</sup> ABLIKIM	200	BES3 $e^+e^- \rightarrow \eta J/\psi$
4391.5 <sup>+6.3</sup> <sub>-6.8</sub> ± 1.0	ABLIKIM	17G	BES3 $e^+e^- \rightarrow \pi^+\pi^- h_c$

<sup>1</sup> From a fit of the measured cross section in the range  $\sqrt{s} = 3.808\text{--}4.600$  GeV.

NODE=M236M

NODE=M236M

NEW

NODE=M236M;LINKAGE=B

 **$\psi(4390)$  WIDTH**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>139<sup>+16</sup><sub>-20</sub> OUR AVERAGE</b> [140 <sup>+16</sup> <sub>-21</sub> MeV OUR 2020 AVERAGE]			
135.8 ± 60.8 ± 22.5	<sup>1</sup> ABLIKIM	200	BES3 $e^+e^- \rightarrow \eta J/\psi$
139.5 <sup>+16.2</sup> <sub>-20.6</sub> ± 0.6	ABLIKIM	17G	BES3 $e^+e^- \rightarrow \pi^+\pi^- h_c$

<sup>1</sup> From a fit of the measured cross section in the range  $\sqrt{s} = 3.808\text{--}4.600$  GeV.

NODE=M236W

NODE=M236W

NEW

NODE=M236W;LINKAGE=B

 **$\psi(4390)$  DECAY MODES**

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $e^+e^-$	
$\Gamma_2$ $\pi^+\pi^- h_c$	seen
$\Gamma_3$ $\eta J/\psi$	seen
$\Gamma_4$ $\pi^+\pi^- \psi(3770)$	possibly seen

NODE=M236215;NODE=M236

DESIG=5

DESIG=1

DESIG=4

DESIG=3

 **$\psi(4390)$   $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$** 

$\Gamma(\eta J/\psi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	DOCUMENT ID	TECN	COMMENT	$\Gamma_3\Gamma_1/\Gamma$
VALUE (eV)				

• • • We do not use the following data for averages, fits, limits, etc. • • •

3.4 ± 2.2	<sup>1</sup> ABLIKIM	200	BES3 $e^+e^- \rightarrow \eta J/\psi$
1.5 ± 1.0	<sup>2</sup> ABLIKIM	200	BES3 $e^+e^- \rightarrow \eta J/\psi$
1.7 ± 1.1	<sup>3</sup> ABLIKIM	200	BES3 $e^+e^- \rightarrow \eta J/\psi$

<sup>1</sup> Solution 1 of three equivalent fit solutions using three resonant structures.

<sup>2</sup> Solution 2 of three equivalent fit solutions using three resonant structures.

<sup>3</sup> Solution 3 of three equivalent fit solutions using three resonant structures.

NODE=M236218

NODE=M236R04

NODE=M236R04

OCCUR=2

OCCUR=3

NODE=M236R04;LINKAGE=A

NODE=M236R04;LINKAGE=B

NODE=M236R04;LINKAGE=C

 **$\psi(4390)$  BRANCHING RATIOS**

$\Gamma(\pi^+\pi^- h_c)/\Gamma_{\text{total}}$	DOCUMENT ID	TECN	COMMENT	$\Gamma_2/\Gamma$
VALUE				
seen	ABLIKIM	17G	BES3 $e^+e^- \rightarrow \pi^+\pi^- h_c$	

NODE=M236220

NODE=M236R01

NODE=M236R01

$\Gamma(\eta J/\psi)/\Gamma_{\text{total}}$	DOCUMENT ID	TECN	COMMENT	$\Gamma_3/\Gamma$
VALUE				
seen	<sup>1</sup> ABLIKIM	200	BES3 $e^+e^- \rightarrow \eta J/\psi$	

NODE=M236R03

NODE=M236R03

<sup>1</sup> With a significance of 6.0  $\sigma$ .

NODE=M236R03;LINKAGE=A

$\Gamma(\pi^+\pi^-\psi(3770))/\Gamma_{\text{total}}$  $\Gamma_4/\Gamma$ 

VALUE

DOCUMENT ID

TECN

COMMENT

possibly seen

<sup>1</sup> ABLIKIM 19AR BES3  $e^+e^- \rightarrow \pi^+\pi^-D\bar{D}$ <sup>1</sup> Observe  $e^+e^- \rightarrow \pi^+\pi^-\psi(3770)$  at  $\sqrt{s} = 4.26, 4.36,$  and  $4.42$  GeV but cannot establish if continuum or resonant.NODE=M236R02  
NODE=M236R02

NODE=M236R02;LINKAGE=A

 **$\psi(4390)$  REFERENCES**

ABLIKIM	200	PR D102 031101	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19AR	PR D100 032005	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17G	PRL 118 092002	M. Ablikim <i>et al.</i>	(BESIII Collab.)

NODE=M236

REFID=60344  
REFID=59910  
REFID=57915